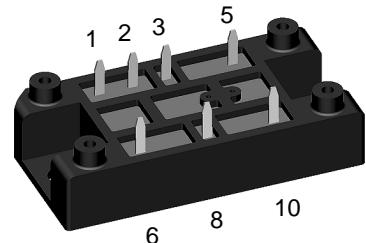
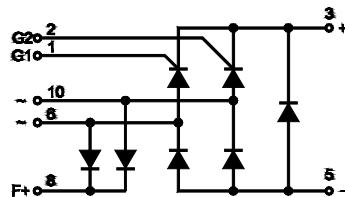


# Half Controlled Single Phase Rectifier Bridge

Including Freewheeling Diode and Field Diodes

**V<sub>RRM</sub> = 800-1600 V**  
**I<sub>dAVM</sub> = 32 A**

V <sub>RSM</sub> V <sub>DSM</sub>	V <sub>RRM</sub> V <sub>DRM</sub>	Type
V	V	
900	800	VHFD 29-08io1
1300	1200	VHFD 29-12io1
1500	1400	VHFD 29-14io1
1700	1600	VHFD 29-16io1



## Bridge and Freewheeling Diode

Symbol	Test Conditions	Maximum Ratings	
I <sub>dAV</sub>	T <sub>H</sub> = 85°C, module	28	A
I <sub>dAVM</sub> ①	module	32	A
I <sub>FRMS</sub> , I <sub>TRMS</sub>	per leg	25	A
I <sub>FSM</sub> , I <sub>TSM</sub>	T <sub>VJ</sub> = 45°C; V <sub>R</sub> = 0 V	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	300 A 330 A
	T <sub>VJ</sub> = T <sub>VJM</sub> V <sub>R</sub> = 0 V	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	270 A 300 A
I <sup>2</sup> t	T <sub>VJ</sub> = 45°C V <sub>R</sub> = 0 V	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	440 A <sup>2</sup> s 455 A <sup>2</sup> s
	T <sub>VJ</sub> = T <sub>VJM</sub> V <sub>R</sub> = 0 V	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	365 A <sup>2</sup> s 370 A <sup>2</sup> s
(di/dt) <sub>cr</sub>	T <sub>VJ</sub> = 125°C f = 50 Hz, t <sub>p</sub> = 200 μs V <sub>D</sub> = 2/3 V <sub>DRM</sub> I <sub>G</sub> = 0.3 A, di <sub>G</sub> /dt = 0.3 A/μs	repetitive, I <sub>T</sub> = 50 A  non repetitive, I <sub>T</sub> = 0.5 I <sub>dAV</sub>	150 A/μs 500 A/μs
(dv/dt) <sub>cr</sub>	T <sub>VJ</sub> = T <sub>(v)jm</sub> ; V <sub>DR</sub> = 2/3 V <sub>DRM</sub> R <sub>GR</sub> = ∞; method 1 (linear voltage rise)		1000 V/μs
V <sub>RGM</sub>		10	V
P <sub>GM</sub>	T <sub>VJ</sub> = T <sub>VJM</sub> I <sub>T</sub> = 0.5 I <sub>dAVM</sub>	t <sub>p</sub> = 30 μs t <sub>p</sub> = 500 μs t <sub>p</sub> = 10 ms	≤ 10 W ≤ 5 W ≤ 1 W 0.5 W
P <sub>GAVM</sub>		-40...+125 °C	
T <sub>VJ</sub>		125 °C	
T <sub>VJM</sub>		-40...+125 °C	
T <sub>stg</sub>		-40...+125 °C	
V <sub>ISOL</sub>	50/60 Hz, RMS I <sub>ISOL</sub> ≤ 1 mA	t = 1 min t = 1 s	3000 V~ 3600 V~
d <sub>s</sub>	Creep distance on surface	12.7 mm	
d <sub>A</sub>	Strike distance in air	9.4 mm	
a	Max. allowable acceleration	50 m/s <sup>2</sup>	
M <sub>d</sub>	Mounting torque (M5) (10-32 UNF)	2-2.5 Nm 18-22 lb.in.	
Weight		35 g	

## Features

- Package with DCB ceramic base plate
- Isolation voltage 3600 V~
- Planar passivated chips
- Blocking voltage up to 1600 V
- Low forward voltage drop
- Leads suitable for PC board soldering
- UL registered E 72873

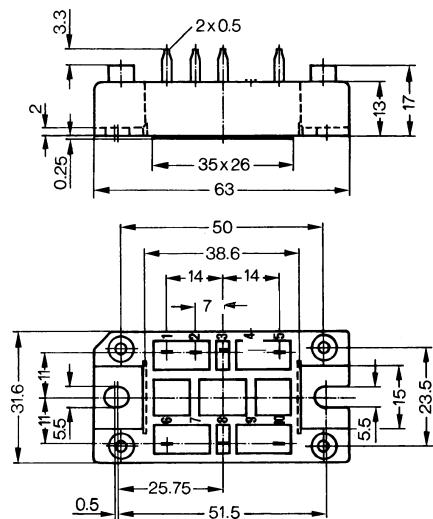
## Applications

- Supply for DC power equipment
- DC motor control

## Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling

## Dimensions in mm (1 mm = 0.0394")



Symbol	Test Conditions	Characteristic Values		
$I_R, I_D$	$V_R = V_{RRM}; V_D = V_{DRM}$ $T_{VJ} = T_{VJM}$ $T_{VJ} = 25^\circ C$	≤ 5	mA	
		≤ 0.3	mA	
$V_T, V_F$	$I_T, I_F = 45 A; T_{VJ} = 25^\circ C$	≤ 1.6	V	
$V_{TO}$	For power-loss calculations only ( $T_{VJ} = 125^\circ C$ )	0.9	V	
$r_T$		15	mΩ	
$V_{GT}$	$V_D = 6 V;$ $T_{VJ} = 25^\circ C$ $T_{VJ} = -40^\circ C$	≤ 1.0	V	
		≤ 1.2	V	
$I_{GT}$	$V_D = 6 V;$ $T_{VJ} = 25^\circ C$ $T_{VJ} = -40^\circ C$ $T_{VJ} = 125^\circ C$	≤ 65	mA	
		≤ 80	mA	
		≤ 50	mA	
$V_{GD}$	$T_{VJ} = T_{VJM};$ $T_{VJ} = T_{VJM};$	$V_D = 2/3 V_{DRM}$	≤ 0.2	V
$I_{GD}$		$V_D = 2/3 V_{DRM}$	≤ 5	mA
$I_L$	$I_G = 0.3 A; t_G = 30 \mu s;$ $di_G/dt = 0.3 A/\mu s;$ $T_{VJ} = 25^\circ C$ $T_{VJ} = -40^\circ C$ $T_{VJ} = 125^\circ C$	≤ 150	mA	
		≤ 200	mA	
		≤ 100	mA	
$I_H$	$T_{VJ} = 25^\circ C; V_D = 6 V; R_{GK} = \infty$	≤ 100	mA	
$t_{gd}$	$T_{VJ} = 25^\circ C; V_D = 0.5 V_{DRM}$ $I_G = 0.3 A; di_G/dt = 0.3 A/\mu s$	≤ 2	μs	
$t_g$	$T_{VJ} = 125^\circ C, I_T = 15 A, t_p = 300 \mu s, V_R = 100 V$	typ.	150	μs
$Q_r$	$di/dt = -10 A/\mu s, dv/dt = 20 V/\mu s, V_D = 2/3 V_{DRM}$		75	μC
$R_{thJC}$	per thyristor (diode); DC current	1.4	K/W	
	per module	0.35	K/W	
$R_{thJH}$	per thyristor (diode); DC current	2.0	K/W	
	per module	0.5	K/W	

## Field Diodes

Symbol	Test Conditions	Maximum Ratings		
$I_{FAV}$	$T_H = 85^\circ C$ , per Diode	4	A	
$I_{FAVM}$	per diode	4	A	
$I_{FRMS}$	per diode	6	A	
$I_{FSM}$	$T_{VJ} = 45^\circ C;$ $V_R = 0 V$	$t = 10 ms (50 Hz), sine$ $t = 8.3 ms (60 Hz), sine$	100	A
			110	A
	$T_{VJ} = T_{VJM}$ $V_R = 0 V$	$t = 10 ms (50 Hz), sine$ $t = 8.3 ms (60 Hz), sine$	85	A
			94	A
$I^2t$	$T_{VJ} = 45^\circ C$ $V_R = 0 V$	$t = 10 ms (50 Hz), sine$ $t = 8.3 ms (60 Hz), sine$	50	A <sup>2</sup> s
			50	A <sup>2</sup> s
	$T_{VJ} = T_{VJM}$ $V_R = 0 V$	$t = 10 ms (50 Hz), sine$ $t = 8.3 ms (60 Hz), sine$	36	A <sup>2</sup> s
			37	A <sup>2</sup> s
$I_R$	$V_R = V_{RRM}$	$T_{VJ} = T_{VJM}$ $T_{VJ} = 25^\circ C$	1	mA
			0.15	mA
$V_F$	$I_F = 21 A; T_{VJ} = 25^\circ C$	1.83	V	
$V_{TO}$	For power-loss calculations only ( $T_{VJ} = 125^\circ C$ )	0.9	V	
$r_T$		50	mΩ	
$R_{thJC}$	per diode; DC current	4.4	K/W	
$R_{thJH}$	per diode; DC current	5.2	K/W	

Data according to IEC 60747 and refer to a single thyristor/diode unless otherwise stated.

① for resistive load

IXYS reserves the right to change limits, test conditions and dimensions.

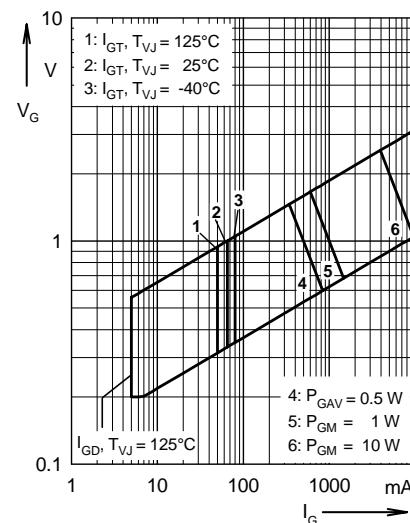


Fig. 1 Gate trigger range

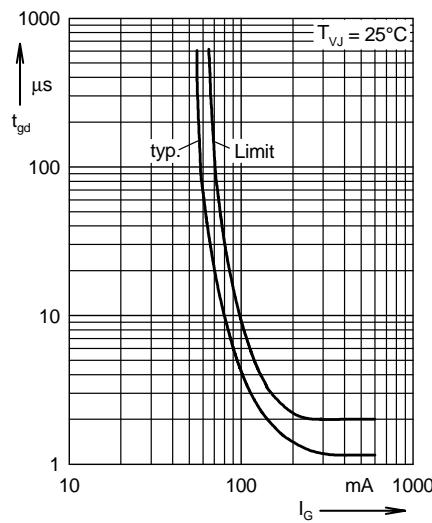


Fig. 2 Gate controlled delay time  $t_{gd}$

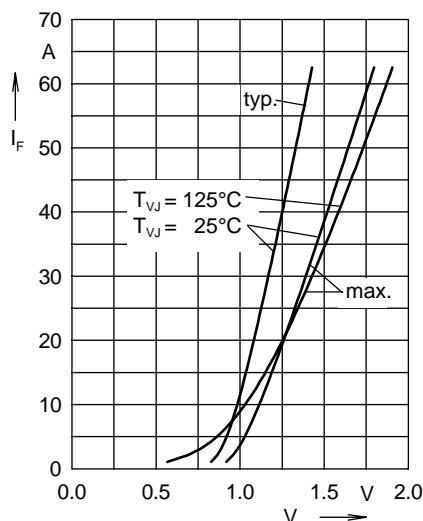


Fig. 3 Forward current versus voltage drop per diode

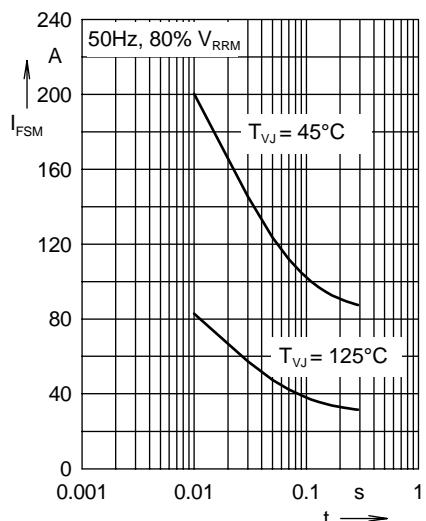


Fig. 4 Surge overload current

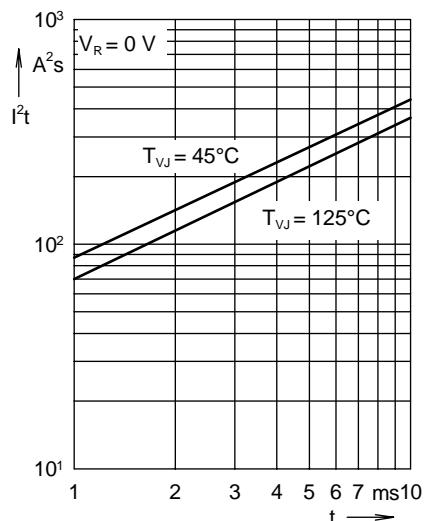


Fig. 5  $I^2t$  versus time per diode

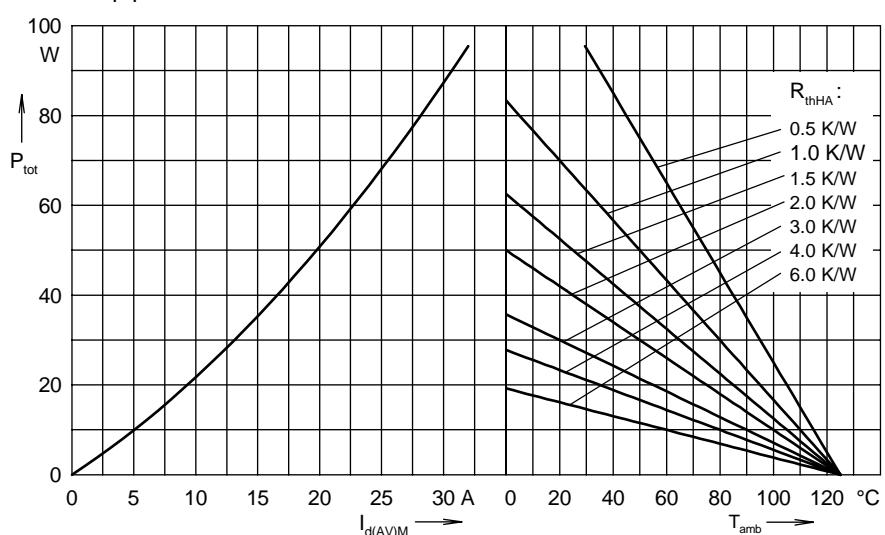


Fig. 6 Power dissipation versus direct output current and ambient temperature

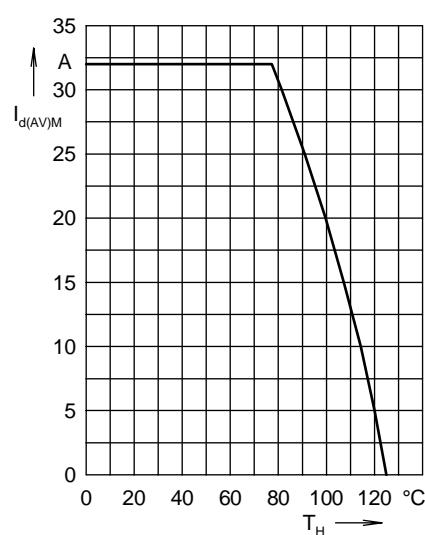


Fig. 7 Max. forward current versus heatsink temperature

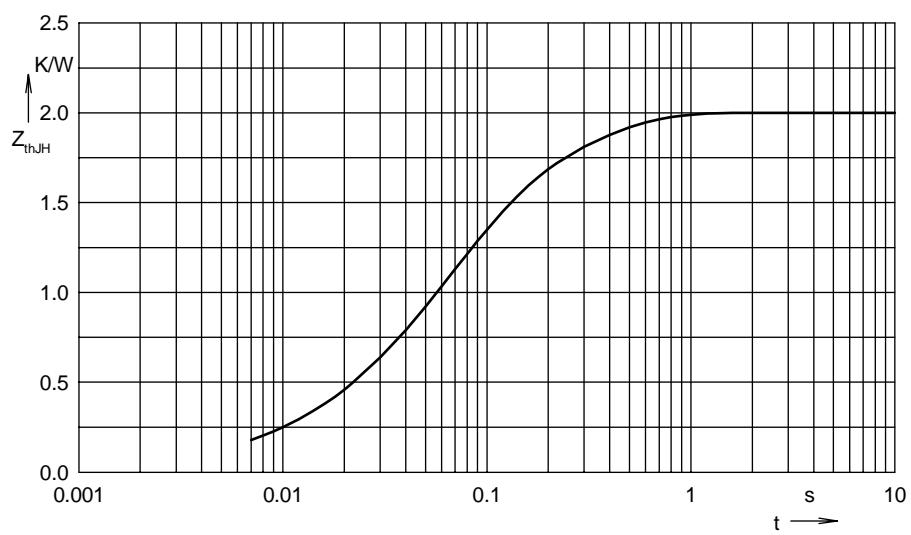


Fig. 8 Transient thermal impedance junction to heatsink

Constants for  $Z_{thJH}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.007	0.008
2	0.266	0.05
3	1.127	0.06
4	0.6	0.25